

# Pertussis Report

June 1, 2015

California experienced a pertussis epidemic in 2014. Pertussis is cyclical and peaks every 3-5 years as the numbers of susceptible persons in the population increases due to waning of immunity following both vaccination and disease. The last epidemic in California occurred in 2010, however, the overall incidence of pertussis has increased since the 1990s. One reason for the increase is the use of acellular pertussis vaccines, which cause fewer reactions than the whole-cell vaccines that preceded them, but do not protect as long. Young infants are at greatest risk of hospitalization and death from pertussis, therefore pregnant women are encouraged to receive pertussis vaccine (Tdap) during the 3rd trimester of every pregnancy. Pertussis antibodies are transferred from vaccinated mothers to their infants and will help protect them until they are old enough to be vaccinated. The primary DTaP vaccine series is essential for reducing severe disease in young infants and should not be delayed. DTaP can be given to infants at an accelerated schedule with the first dose given as early as 6 weeks of age. Even one dose of DTaP may offer some protection against severe pertussis disease in infants.

- **2,552 cases with onset in 2015** have been reported to CDPH.
  - More than 300 cases were reported occurring in each of the months of January, February and March. While this is lower than the peak in May 2014, it remains above the interepidemic levels seen in 2013.
  - 93 cases have been hospitalized; 20 (22%) of these required intensive care
    - 62 (67%) of hospitalized patients were infants <4 months of age.
  - One death has been reported in an infant that was <3 weeks of age at the time of disease onset.
  
- **11,203 cases with onset in 2014** were reported to CDPH for a state rate of 29.3 cases per 100,000 population (Table 1, Figure 1-3).
  - 456 cases were hospitalized; 119 (26%) of these required intensive care.
    - 278 (61%) of hospitalized patients were infants <4 months of age.
  - Three deaths with disease onset in 2014 were reported; all were infants who were ≤ 5 weeks old at time of disease onset.
    - Two additional deaths occurring in 2014 but with disease onset in 2013 were reported. These cases will be attributed to 2013. Both infants were ≤2 months of age at disease onset.
  - Of the 301 (57%) cases <4 months of age whose mothers vaccination history was available, 46 (15%) reported receiving Tdap during the third trimester of pregnancy between 27-36 weeks gestation, as is recommended by ACIP and ACOG.
  - The majority of cases with known age have occurred in infants and children <18 years of age (9,894; 89%) and the peak ages are <1 year and 15 years old (Figure 4).
    - 754 (8%) of pediatric cases were infants <6 months of age.
    - 6,359 (64%) of pediatric cases were children/adolescents 7-16 years of age.
    - Among 8,702 (88%) of pediatric cases with vaccination history information, 848 (10%) had never received any doses of pertussis-containing vaccine.
  - Overall pertussis rates are highest for infants <1 year of age and older children and adolescents and teens 10-17 years of age. Rates by race/ethnicity are highest for Hispanic and African American infants <1 year of age and White, non-Hispanic adolescents and teens aged 10-17 years of age (Figure 5).

Table 1. Pertussis cases and rate\* by year of onset and local health jurisdiction -- California, 2010-2015\*\*

|                     | 2010¶       |             | 2011¶       |            | 2012¶       |            | 2013¶       |            | 2014**       |             | 2015**      |            |
|---------------------|-------------|-------------|-------------|------------|-------------|------------|-------------|------------|--------------|-------------|-------------|------------|
|                     | Cases       | Rate        | Cases       | Rate       | Cases       | Rate       | Cases       | Rate       | Cases        | Rate        | Cases       | Rate       |
| <b>CALIFORNIA</b>   | <b>9159</b> | <b>24.5</b> | <b>3016</b> | <b>8.0</b> | <b>1023</b> | <b>2.7</b> | <b>2537</b> | <b>6.6</b> | <b>11203</b> | <b>29.3</b> | <b>2552</b> | <b>6.7</b> |
| ALAMEDA             | 423         | 30.2        | 206         | 14.6       | 62          | 4.4        | 124         | 8.6        | 364          | 25.1        | 118         | 8.1        |
| City of Berkeley‡   | 13          | 11.5        | 3           | 2.6        | 6           | 5.2        | 13          | 11.3       | 56           | 48.6        | 6           | 5.2        |
| ALPINE              | 0           | 0.0         | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 0            | 0.0         | 0           | 0.0        |
| AMADOR              | 4           | 10.6        | 11          | 29.5       | 1           | 2.7        | 2           | 5.5        | 1            | 2.8         | 0           | 0.0        |
| BUTTE               | 32          | 14.5        | 16          | 7.3        | 3           | 1.4        | 33          | 14.9       | 33           | 14.9        | 4           | 1.8        |
| CALAVERAS           | 9           | 19.8        | 5           | 11.1       | 0           | 0.0        | 2           | 4.4        | 17           | 37.3        | 1           | 2.2        |
| COLUSA              | 11          | 51.2        | 1           | 4.7        | 0           | 0.0        | 0           | 0.0        | 0            | 0.0         | 3           | 13.9       |
| CONTRA COSTA        | 205         | 19.5        | 114         | 10.7       | 24          | 2.2        | 69          | 6.4        | 477          | 44.1        | 129         | 11.9       |
| DEL NORTE           | 16          | 56.1        | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 2            | 7.2         | 0           | 0.0        |
| EL DORADO           | 54          | 29.8        | 11          | 6.1        | 3           | 1.6        | 4           | 2.2        | 36           | 19.6        | 13          | 7.1        |
| FRESNO              | 550         | 59.0        | 58          | 6.2        | 16          | 1.7        | 44          | 4.6        | 392          | 40.9        | 20          | 2.1        |
| GLENN               | 1           | 3.6         | 1           | 3.5        | 0           | 0.0        | 0           | 0.0        | 1            | 3.5         | 2           | 7.1        |
| HUMBOLDT            | 58          | 43.1        | 15          | 11.1       | 1           | 0.7        | 5           | 3.7        | 149          | 110.5       | 43          | 31.9       |
| IMPERIAL            | 9           | 5.1         | 3           | 1.7        | 8           | 4.5        | 3           | 1.7        | 10           | 5.6         | 7           | 3.9        |
| INYO                | 8           | 43.2        | 0           | 0.0        | 1           | 5.3        | 0           | 0.0        | 0            | 0.0         | 0           | 0.0        |
| KERN                | 376         | 44.7        | 49          | 5.8        | 2           | 0.2        | 31          | 3.6        | 163          | 18.8        | 108         | 12.5       |
| KINGS               | 26          | 17.0        | 7           | 4.6        | 0           | 0.0        | 2           | 1.3        | 16           | 10.6        | 4           | 2.7        |
| LAKE                | 5           | 7.7         | 3           | 4.7        | 2           | 3.1        | 3           | 4.7        | 3            | 4.7         | 7           | 10.9       |
| LASSEN              | 1           | 2.8         | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 5            | 15.3        | 0           | 0.0        |
| LOS ANGELES         | 1303        | 14.1        | 612         | 6.6        | 209         | 2.2        | 342         | 3.6        | 1997         | 21.2        | 643         | 6.8        |
| City of Long Beach‡ | 68          | 14.7        | 17          | 3.7        | 4           | 0.9        | 16          | 3.4        | 182          | 39.1        | 23          | 4.9        |
| City of Pasadena‡   | 24          | 17.5        | 15          | 10.8       | 1           | 0.7        | 2           | 1.4        | 22           | 15.8        | 3           | 2.2        |
| MADERA              | 120         | 79.3        | 8           | 5.3        | 0           | 0.0        | 10          | 6.5        | 47           | 30.7        | 2           | 1.3        |
| MARIN               | 351         | 138.9       | 26          | 10.2       | 5           | 2.0        | 184         | 71.9       | 272          | 106.3       | 40          | 15.6       |
| MARIPOSA            | 10          | 55.0        | 1           | 5.6        | 0           | 0.0        | 0           | 0.0        | 0            | 0.0         | 0           | 0.0        |
| MENDOCINO           | 27          | 30.7        | 3           | 3.4        | 0           | 0.0        | 6           | 6.8        | 10           | 11.3        | 1           | 1.1        |
| MERCED              | 131         | 51.2        | 27          | 10.4       | 0           | 0.0        | 1           | 0.4        | 9            | 3.4         | 6           | 2.3        |
| MODOC               | 0           | 0.0         | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 6            | 64.7        | 0           | 0.0        |
| MONO                | 18          | 126.4       | 2           | 14.0       | 21          | 146.1      | 2           | 14.1       | 0            | 0.0         | 0           | 0.0        |
| MONTEREY            | 132         | 31.7        | 38          | 9.0        | 17          | 4.0        | 49          | 11.5       | 129          | 30.4        | 46          | 10.8       |
| NAPA                | 25          | 18.3        | 11          | 8.0        | 6           | 4.3        | 13          | 9.3        | 137          | 98.5        | 27          | 19.4       |
| NEVADA              | 23          | 23.3        | 2           | 2.0        | 5           | 5.1        | 70          | 71.5       | 16           | 16.3        | 1           | 1.0        |
| ORANGE              | 499         | 16.5        | 142         | 4.7        | 73          | 2.4        | 113         | 3.6        | 447          | 14.4        | 72          | 2.3        |
| PLACER              | 80          | 22.8        | 19          | 5.3        | 11          | 3.1        | 86          | 23.6       | 122          | 33.4        | 22          | 6.0        |
| PLUMAS              | 2           | 10.0        | 4           | 20.1       | 0           | 0.0        | 1           | 5.2        | 1            | 5.2         | 1           | 5.2        |
| RIVERSIDE           | 467         | 21.3        | 166         | 7.5        | 46          | 2.0        | 80          | 3.5        | 469          | 20.7        | 108         | 4.8        |
| SACRAMENTO          | 175         | 12.3        | 69          | 4.8        | 35          | 2.4        | 70          | 4.8        | 447          | 30.9        | 174         | 12.0       |
| SAN BENITO          | 7           | 12.7        | 3           | 5.4        | 1           | 1.8        | 1           | 1.7        | 11           | 19.2        | 3           | 5.2        |
| SAN BERNARDINO      | 182         | 8.9         | 115         | 5.6        | 54          | 2.6        | 39          | 1.9        | 205          | 9.9         | 44          | 2.1        |
| SAN DIEGO           | 1140        | 36.7        | 398         | 12.7       | 162         | 5.1        | 408         | 12.8       | 2017         | 63.4        | 427         | 13.4       |
| SAN FRANCISCO       | 141         | 17.5        | 70          | 8.6        | 30          | 3.6        | 59          | 7.1        | 128          | 15.4        | 31          | 3.7        |
| SAN JOAQUIN         | 84          | 12.2        | 27          | 3.9        | 15          | 2.1        | 26          | 3.7        | 216          | 30.7        | 48          | 6.8        |
| SAN LUIS OBISPO     | 371         | 137.5       | 15          | 5.6        | 14          | 5.2        | 17          | 6.3        | 45           | 16.6        | 7           | 2.6        |
| SAN MATEO           | 191         | 26.5        | 58          | 8.0        | 23          | 3.1        | 104         | 14.0       | 129          | 17.4        | 11          | 1.5        |
| SANTA BARBARA       | 66          | 15.6        | 18          | 4.2        | 11          | 2.6        | 28          | 6.5        | 120          | 27.8        | 39          | 9.0        |
| SANTA CLARA         | 478         | 26.8        | 176         | 9.7        | 45          | 2.5        | 254         | 13.7       | 538          | 29.0        | 75          | 4.0        |
| SANTA CRUZ          | 87          | 33.1        | 22          | 8.3        | 13          | 4.8        | 54          | 19.9       | 165          | 60.8        | 29          | 10.7       |
| SHASTA              | 32          | 18.0        | 27          | 15.2       | 2           | 1.1        | 7           | 3.9        | 33           | 18.5        | 12          | 6.7        |
| SIERRA              | 0           | 0.0         | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 0            | 0.0         | 0           | 0.0        |
| SISKIYOU            | 10          | 22.3        | 0           | 0.0        | 2           | 4.4        | 5           | 11.1       | 7            | 15.5        | 6           | 13.3       |
| SOLANO              | 40          | 9.7         | 12          | 2.9        | 10          | 2.4        | 15          | 3.5        | 144          | 34.0        | 20          | 4.7        |
| SONOMA              | 246         | 50.8        | 116         | 23.8       | 18          | 3.7        | 51          | 10.4       | 704          | 143.0       | 18          | 3.7        |
| STANISLAUS          | 159         | 30.9        | 43          | 8.3        | 11          | 2.1        | 16          | 3.0        | 91           | 17.3        | 31          | 5.9        |
| SUTTER              | 5           | 5.3         | 1           | 1.1        | 0           | 0.0        | 2           | 2.1        | 9            | 9.3         | 2           | 2.1        |
| TEHAMA              | 10          | 15.8        | 1           | 1.6        | 0           | 0.0        | 0           | 0.0        | 38           | 59.9        | 3           | 4.7        |
| TRINITY             | 0           | 0.0         | 0           | 0.0        | 0           | 0.0        | 0           | 0.0        | 6            | 44.6        | 4           | 29.8       |
| TULARE              | 230         | 51.9        | 77          | 17.2       | 27          | 6.0        | 25          | 5.5        | 37           | 8.1         | 61          | 13.4       |
| TUOLUMNE            | 32          | 58.0        | 4           | 7.3        | 1           | 1.8        | 2           | 3.7        | 16           | 29.5        | 5           | 9.2        |
| VENTURA             | 372         | 45.1        | 163         | 19.6       | 15          | 1.8        | 36          | 4.3        | 349          | 41.5        | 36          | 4.3        |
| YOLO                | 17          | 8.4         | 5           | 2.5        | 6           | 2.9        | 4           | 1.9        | 147          | 71.3        | 4           | 1.9        |
| YUBA                | 3           | 4.1         | 0           | 0.0        | 1           | 1.4        | 4           | 5.5        | 10           | 13.6        | 2           | 2.7        |

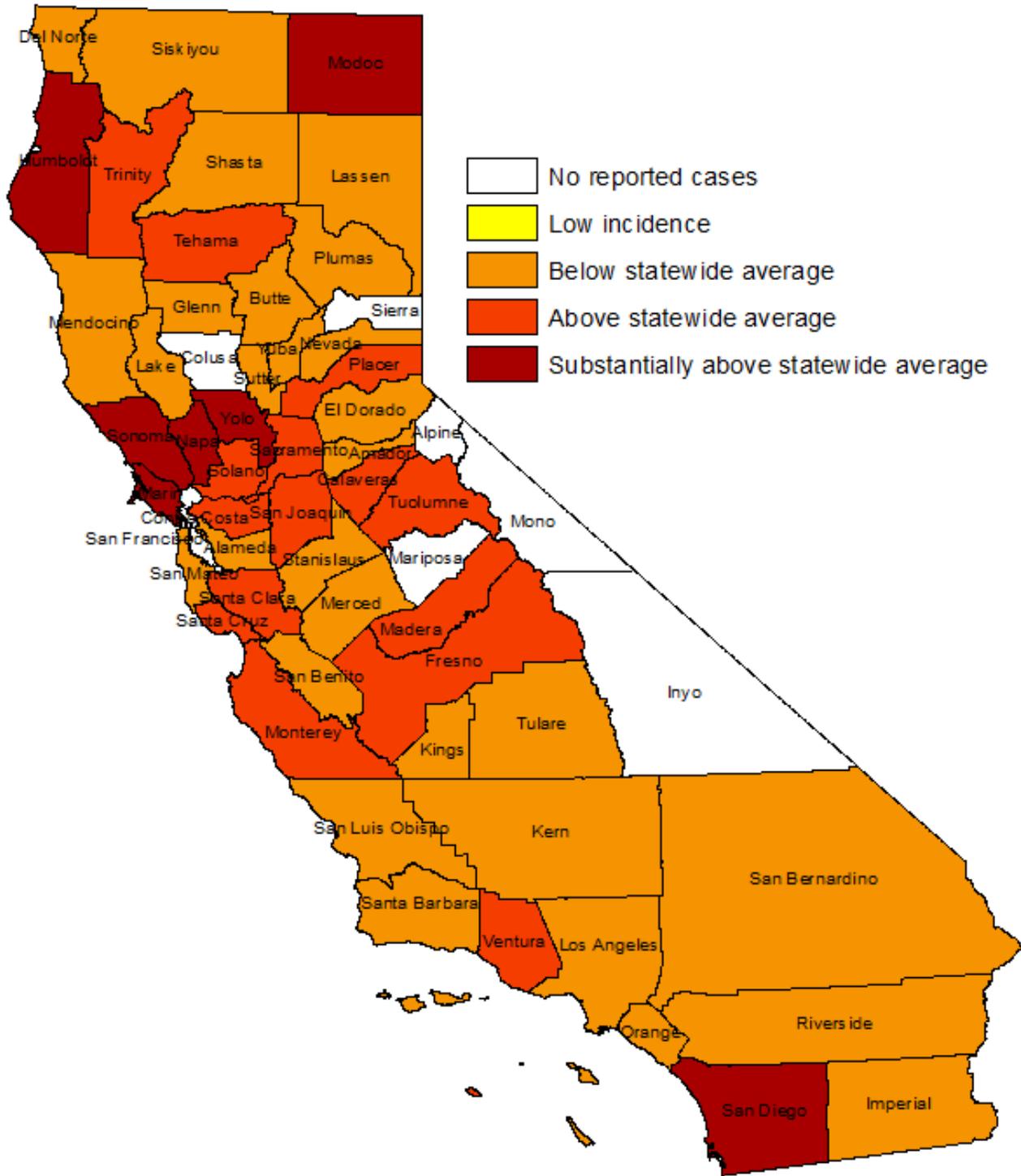
\*Incidence rate per 100,000 persons

\*\*Includes cases reported to CDPH as of 6/1/2015

¶Data have been updated from previous reports; population denominator data from the Department of Finance have been standardized with 2010 Census data

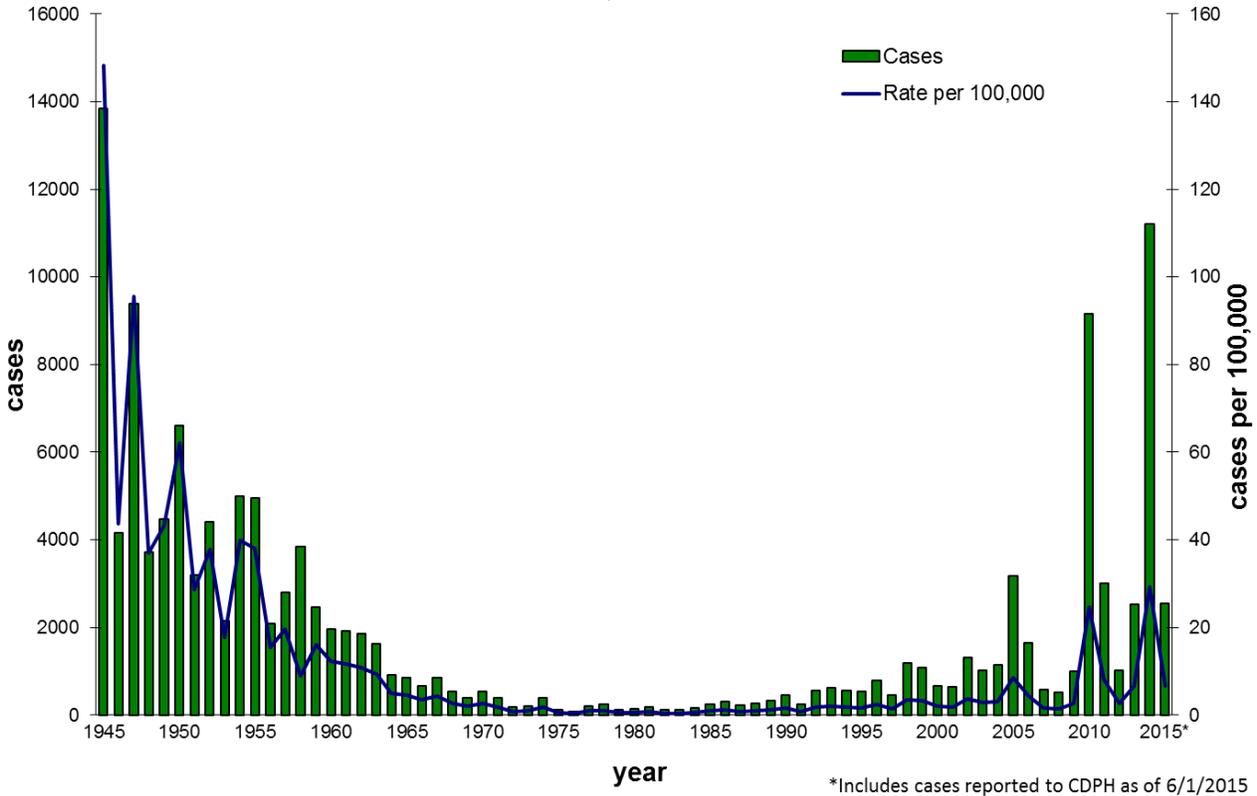
‡City health jurisdictions not included in county total

**Figure 1. Pertussis incidence per 100,000 population, by county – California, 2014**

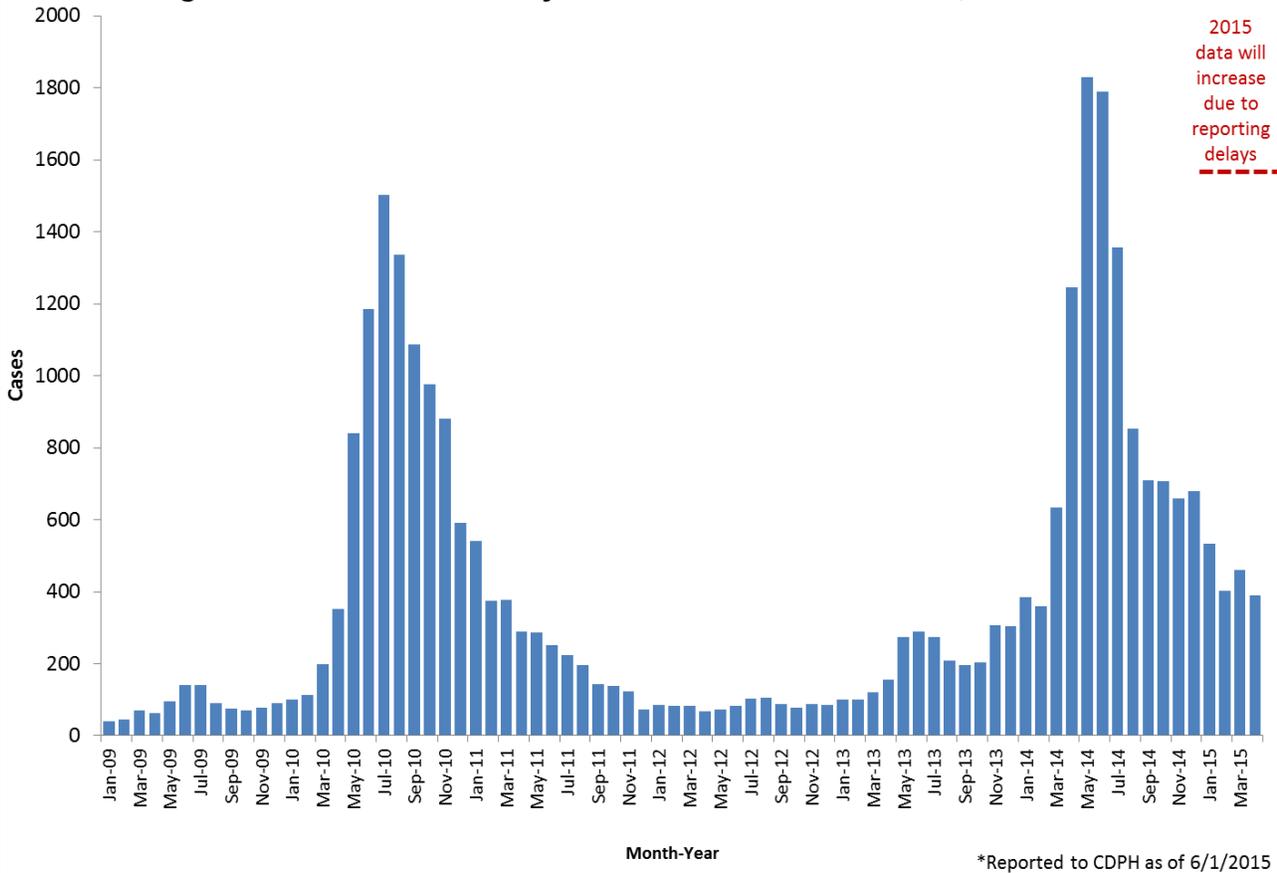


Corresponding category ranges: 0; 0.1-2.7; 2.8-29.2; 29.3-60.0; 60.1-143.0

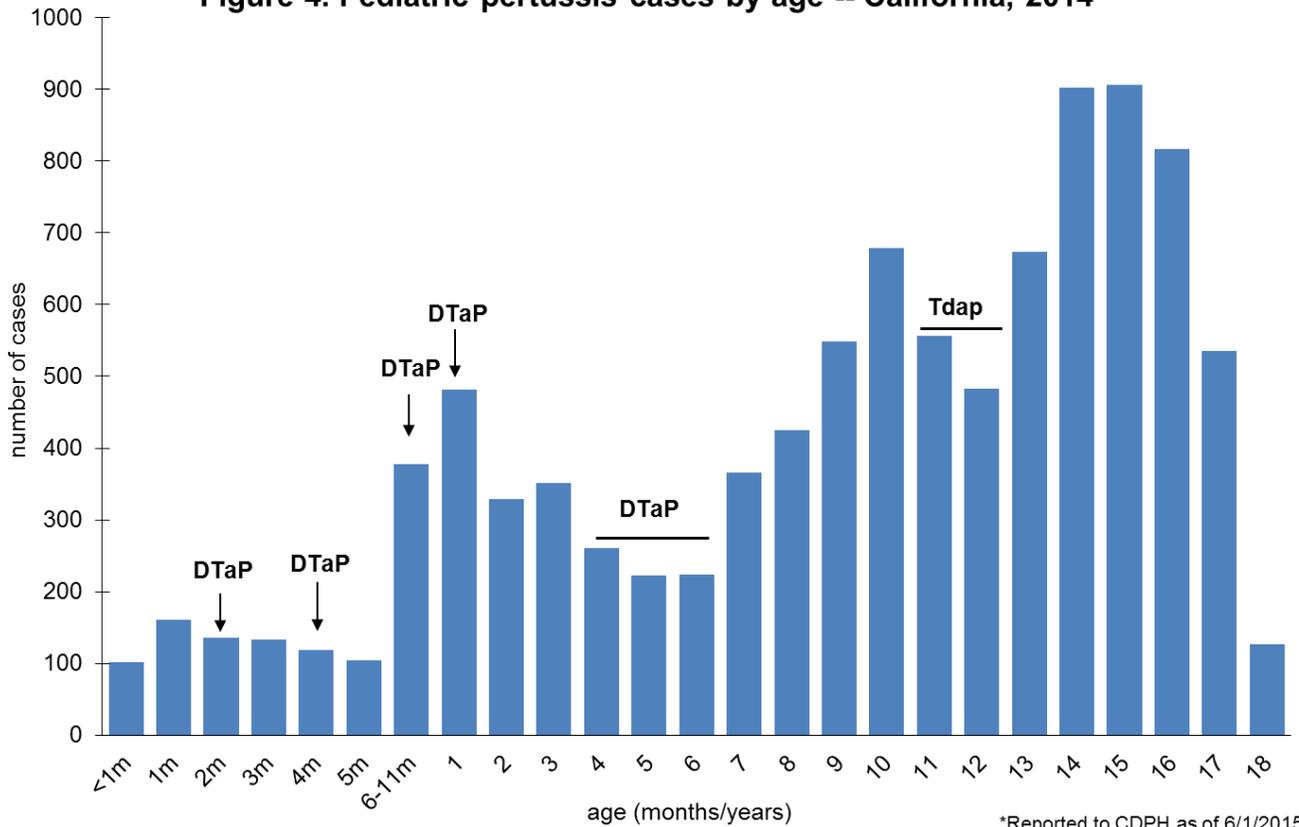
**Figure 2. Number and incidence of reported pertussis cases by year of onset -- California, 1945-2015\***



**Figure 3. Pertussis cases by month of onset -- California, 2009-2015\***

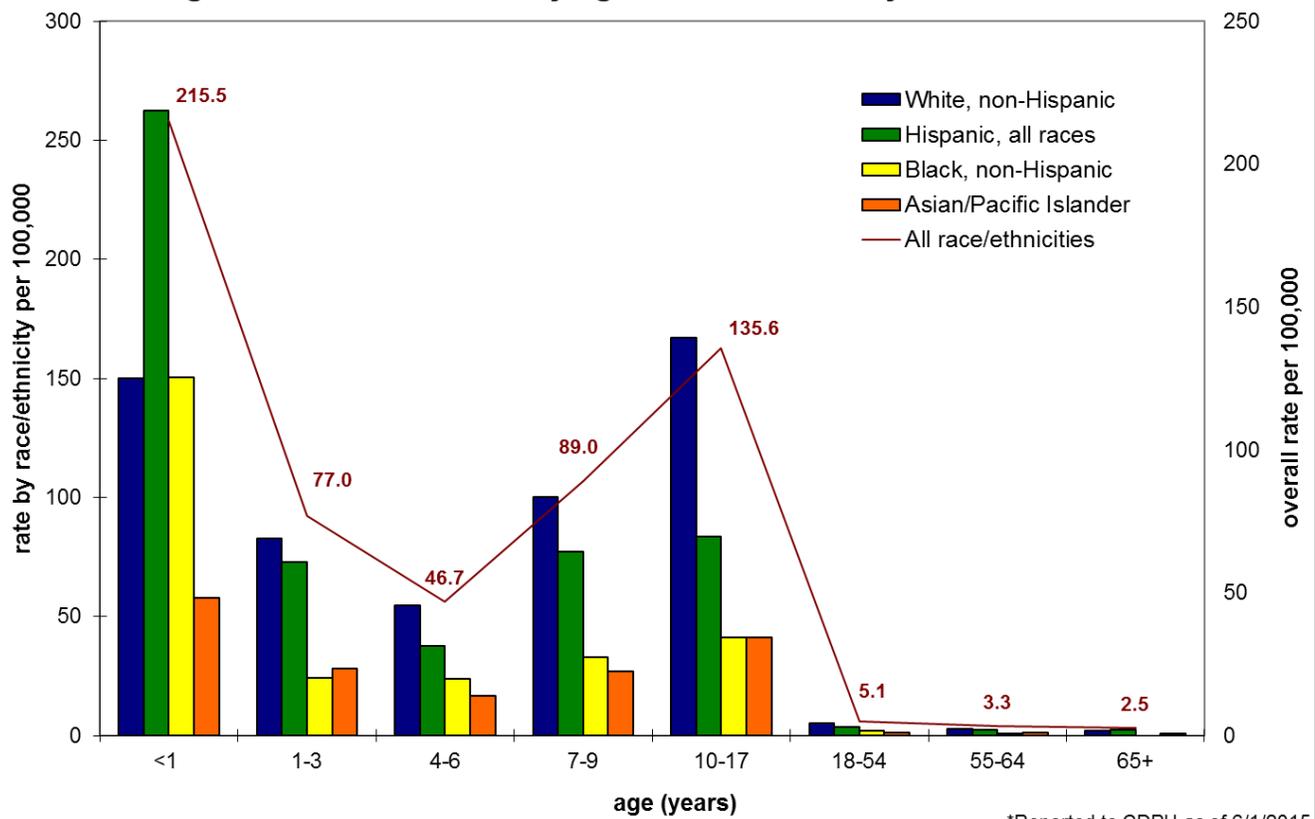


**Figure 4. Pediatric pertussis cases by age -- California, 2014\***



\*Reported to CDPH as of 6/1/2015  
 annotations in black indicated recommended vaccine doses

**Figure 5. Pertussis rates by age and race/ethnicity -- California, 2014\***



\*Reported to CDPH as of 6/1/2015